

**EXPANDING LIVESTOCK INTEGRATED PEST MANAGEMENT IN THE NORTHEAST:** *An IPM Training Opportunity for Northeast US Animal Agriculture Industry Personnel* (SARE Partnership Grant: ONE04-031, 2004-38640-14274)

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**PROJECT SUMMARY:**

Two IPM educational opportunities were offered to train northeast US cooperative extension and other animal agricultural industry outreach personnel in an overview of livestock Integrated Pest Management (IPM). The first training was a two day “hands-on” workshop offering participants a mixture of IPM classroom, laboratory and practical field experience. The second training was a distance learning event via a webcast format.

The initial “train the trainer” workshop held September 28-29, 2004 targeted key personnel involved in animal agriculture including, but not limited to, cooperative extension, state veterinarians, milk inspectors, and other multipliers responsible for local on dairy producer contacts. Participants learned IPM principles and practices as they relate to dairy production and enhance animal and human health, improve net profitability and minimize neighborhood concerns associated with off site migration of livestock fly pests. A combination of classroom, laboratory and on-farm activities were employed to train participants in current livestock pest concerns, techniques and management opportunities. Participants received training to help them acquire knowledge and develop skills to assess livestock pest problems and effectively manage these pests using the latest IPM principles and techniques. Participants were trained in identification, evaluation and management of filth fly pest problems of confined dairy livestock. They also became familiar with IPM resources, and better equipped to effectively assist their clientele in addressing confined dairy fly pests. Participants were surveyed pre and post participation to better assess their livestock IPM needs and concerns, and to help identify interest, opportunity and need for subsequent workshops.

The webcast training was held May 3, 2007. The objectives of the training were as described for the original workshop with presentations delivered as a 2 hour web broadcast. This training addressed IPM principles and practices as related to dairy production and enhancing animal and human health, improving net profitability and minimizing neighborhood concerns associated with off site migration of livestock fly pests. The program format combined a power point presentation lecture by two Veterinary Entomologists and an IPM specialist and discussion of questions from participants. Participants received training to help them acquire knowledge and develop skills to assess livestock pest problems and effectively manage these pests using the latest IPM principles and techniques. Participants were trained in pest identification, evaluation and management of filth fly pest problems of confined dairy livestock. They also became

familiar with IPM resources, and better equipped to effectively assist their clientele in addressing confined dairy fly pests. A post program evaluation was conducted to assess overall impact and help identify interest, opportunity and need for subsequent workshops.

It is anticipated that participants in these dairy IPM training events will help initiate and foster improved communication and networking among livestock IPM practitioners and producer clientele in the northeast US.

## **BACKGROUND INTRODUCTION**

Dairy production is an integral component of many rural communities in the northeastern US, helping to sustain the economic viability of our region. In NY alone 7,100 dairy farms contributed nearly \$1.6 billion in dairy products to the states 2002 economy. In 1997, northeast U.S dairy and beef cattle associated revenues totaled \$4.4 billion (USDA Census of Agriculture). In addition, the value of these dairy and beef commodities in the eastern US, where the results of this project are most applicable, total \$ 15.4 billion.

Biting and nuisance flies, and external parasites adversely affect animal health and productivity and reduce farm profitability. A complex of pests is usually involved, which can differ in the intensity of direct and indirect host effects. Damage from infestations of summer and winter active arthropod pests of dairy and beef cattle in the U.S. are estimated to exceed \$2.26 billion in losses annually (Byford et al. 1992).

In a 1997 survey of New York dairy farmers, twenty-eight percent of respondents indicated flies in and around barn areas were most difficult to control and 43% indicated flies in animal confinement areas were the most likely to cause economic loss (Harrington et al. 1998). Flies in and around the barn were treated an average of once a week. Most respondents (80-90%) employed cultural practices such as manure removal, while less than 5% of respondents released beneficial insects to manage barn flies. In this same survey, 52% of respondents selected flies on pastured cattle as being the most difficult pest to control and 56% indicated pasture flies were the most likely to cause economic loss (Harrington et al. 1998). Additionally, dairy farmers reported using insecticides two to three times per month to manage flies on pastured cattle.

Several challenges currently face those seeking to effectively manage livestock pests today. Implementation of the 1996 federally mandated Food Quality Protection Act (FQPA) has resulted in removal of a number of once commonly used livestock insecticide materials, such as dimethoate, naled and chlorpyrifos. In addition, insecticide manufacturers report fewer insecticides in development for use on livestock in the near future. Efforts by Cornell University researchers have documented widespread insecticide resistance in house flies, a primary pest on livestock operations (Rutz, Kaufman, Scott). In some studies, 100% of house flies treated with specific insecticides survived when treated with the legal application rate of insecticides.

As suburban areas encroach on rural agricultural landscapes, emigration of pest flies to off-site locations can act as a community lightning rod creating a new set of challenges for those involved in animal agriculture. This results from potential public health concerns and nuisance complaints from neighboring communities.

With fewer insecticides available, prospects for new materials limited, insecticide resistance more prevalent, and urbanization of once rural areas becoming more common place, livestock producers will continue to face increased challenges with fly management in the future. These issues highlight the need for producers to have the best information available to manage dairy cattle pests and to utilize a broad integrated approach that includes a variety of cultural, biological, physical and chemical tactics.

Livestock IPM information can, unfortunately, be difficult to obtain when needed most, due to a limited number of entomologists actively engaged in animal research and extension activities. In the northeastern United States, research and extension efforts to develop IPM strategies for managing pests associated with animal production are active at Cornell University (New York) but with few exceptions are lacking at other northeastern state land grant institutions.

The Cornell University veterinary entomology program, working in collaboration with the New York State IPM program, has developed extremely successful confined dairy and poultry fly management programs. Many producers in our region are successfully employing the strategies promoted through these programs that emphasize IPM in and around animal production facilities. Efforts are also underway to improve the information available regarding integrated management of pests affecting animals on pasture.

These IPM training opportunities were offered to share our IPM information and provide outreach professionals with skills and knowledge to train *their* clientele in the use of proven, effective, integrated pest management techniques that help minimize, avoid and mitigate common dairy livestock arthropod pest problems. These trainings will foster team building through direct contact of agriculture animal professionals and the initiation of an electronic listserve to provide networking opportunities and on-line technical support. The webcast program will be captured and made available for viewing on the NYS IPM website.

The primary focus of these workshops were fly pests of dairy cattle in confinement. Much of the information presented is also applicable to managing confinement area fly pests of other livestock and horses.

## **OBJECTIVES / PERFORMANCE TARGETS**

- 1) To increase the number of producers utilizing livestock IPM by increasing the number, awareness and IPM skill level of extension educator multipliers in the northeast. More specifically, we propose to engage extension and other outreach participants from northeastern states in an experiential learning opportunity of classroom, laboratory and on-site education regarding IPM approaches for the effective management of common dairy and livestock summer active arthropod pests.
- 2) To encourage communication and enhance teambuilding we propose initiating an electronic list serve to provide networking opportunities and on-line technical support for participants. This list serve can also help to identify stakeholder driven livestock IPM needs, priorities and opportunities for research and extension.

These workshops are viewed as a means to assess the interest and needs for future regional livestock IPM training for animal agriculture personnel and other outreach professionals.

## **MATERIALS AND METHODS**

### *Identification of participants*

The intended audience for these programs were key personnel involved in animal agriculture including, but not limited to, cooperative extension, state veterinarians, milk inspectors, and other multipliers responsible for outreach and direct on-farm dairy producer contacts. These educational opportunities were advertised through written and electronic mailings to northeast region state IPM coordinators and State Department of Agriculture Milk Inspectors and Sanitarians. These individuals were asked to distribute the program announcements to their appropriate state and local contacts. The Fly IPM webcast was additionally advertised through Northeast SARE and the Northeast IPM Center list serves.

### *Development and presentation of the workshop*

Content for the “train the trainer” workshop and IPM Fly Management webcast were drawn from research information, and educational resources developed by the Cornell University Veterinary Entomology Program, the NYS Integrated Pest Management Program and other land grant sources.

The “train the trainer” workshop agenda was designed in collaboration between the project directors and Mr. Cal Snow a local dairy farmer and long time collaborator and IPM advocate. Laboratory facilities and specimens were provided by the Cornell Veterinary Entomology program. A field trip to enhance the learning experience was made to a local dairy farm (Ron Beck, Freeville NY). The original 2 day workshop combined lecture, laboratory and an on-farm visit to enhance the overall training experience.

The webcast agenda was a synopsis of the lecture portion of the original 2 day workshop. The webcast was a LIVE event produced in collaboration with Cornell University’s Media Production Group, Ithaca, NY and streamed to the world wide web through Cornell’s Fall Creek Television Studio in Ithaca.

To participate in the webcast a viewer needed to access the internet and use their browser to link to a pre-arranged URL link at the NYS IPM Program website. On the day of the event the webcast was available via a 225K sure stream connection which allowed access by a wide spectrum of band widths. Participants needed *Real Player*, an audio/visual software available for free on the internet on their workstation to view the live stream. An archive of the two hour program is available for free at the NYS IPM Program website at: <http://nysipm.cornell.edu/livestock/teleconf.asp>. A portion of the program was devoted to questions from participants via phone or email.

### *Evaluation of the workshop*

Immediately following each workshop, participants were surveyed for their perceptions and feedback regarding program content, usefulness and suggestions for future educational opportunities.

Participant comments for each program were highly favorable. Participants appreciated the blend of lecture, laboratory and practical on-farm visit in the initial program to help reinforce the IPM learning experience. Participants in the webcast training appreciated the content and the convenience of a 2 hour distance learning opportunity to receive Dairy Fly IPM Training. The novelty of receiving education at their workstation and the ability to interact with the presenters for a question and answer period during the program via email or telephone enhanced the learning experience. This streamed webcast has been archived and is available on-line at the NYS PM website, allowing access and review of to this educational resource by additional educators, producer s and industry clientele.

## **RESULTS AND DISCUSSION / MILESTONES**

### **Dairy Fly IPM Workshop:**

A two day Livestock Integrated Pest Management workshop was held September 28-29, 2004 at the Ramada Inn in Ithaca, NY to train representatives of cooperative extension and state milk inspectors from northeastern states. Integrated Pest Management (IPM) Coordinators and State Department of Agriculture Directors from Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia were contacted and invited to nominate cooperative extension and milk inspector professionals to attend the workshop. Fifteen cooperative extension (9), state department of health / Agriculture and Markets milk inspectors (2), dairy producers (1), organic growers (1), state department of agriculture (1), and US EPA (1) participated, representing Maryland, Maine, Massachusetts, New York, and Pennsylvania.

### *Pre-Workshop Survey*

A pre-workshop survey was given to those enrolled to tailor the workshop agenda to best meet participant fly management experience and skill level and needs. Survey responses indicated that although most participants had direct or indirect responsibilities for pest management issues there was considerable diversity in their IPM experience and training. Many participants had responsibilities for training growers, field staff, and/or industry and regulatory personnel, some individuals had Health Department milk inspection responsibilities. Entomological training of participants ranged from “minimal” to PhD. Most individuals did not have any formal training in livestock IPM. Training in IPM varied from “none” to “on-the-job training”, to graduate level courses and multiple years experience in IPM implementation. Many participants stated they had been previously contacted by clientele regarding a livestock pest management problem. Participants indicated their goal for attending the workshop was to learn more about the insect identification, lifecycle and management options of key pests especially of bovines, especially in pastured animals; but other systems too. Participants were interested in learning IPM approaches, less-toxic solutions, current recommendations and latest research findings in livestock IPM. Individuals were interested in constructive ideas for promoting and advancing IPM adoption among NE livestock producers (especially dairy and poultry). Participants were asked to rate the importance of specific livestock pest problems in their state. The results of this survey follow. House fly (1.2), Rodents in /around facilities (1.2), Mosquitoes (1.8), Birds in /around facilities (2.0), Stable fly (2.5), Horse and Deer flies (2.8), Sarcoptic mange (2.8), Chorioptic mange (3.2), Face fly (3.2), Cattle grubs (3.3), Horn fly (3.6), Cockroaches (4.5). Ranking 1 = Highest, 5 = lowest.

### *Workshop*

The workshop consisted of three components: A) classroom presentations providing an overview of integrated pest management concepts, identification, biology, monitoring methods, assessment, management alternatives, control measures and evaluation of IPM programs. B) laboratory examination of live and curated insects specimens, including pests affecting animals in confinement, on pasture, and common natural enemies (arthropod and fungal pathogens) of house and stable flies, and an overview of aspects of current house fly IPM research efforts being conducted at Cornell University. C) On-farm visit to a commercial dairy farm view fly problems and their effective integrated management in situ. The workshop concluded with discussion of resources available to further educate clientele on dairy IPM, a discussion of needs, opportunities, and topics for future workshops and educational resources, and an overall evaluation of the workshop.

### **Dairy Fly IPM Webcast:**

A two hour Dairy Fly Integrated Pest Management training program based on a synopsis of the lecture material provided in the first workshop was held May 3, 2007. The live program was “streamed” as a webcast on the world wide web and accessible through via a link on the New York State Integrated Pest Management Program (NYS IPM) Home page. The target audience for this northeast region train-the-trainer program were extension educators, local, state and federal agency multipliers, veterinarians, and animal nutritionists from northeast states. A small number of dairy producers also participated. The program was widely advertised through Integrated Pest Management (IPM) Coordinators of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia. In addition the program was advertised through listserves of the Northeast IPM Center, Cornell Cooperative Extension, personal contacts with growers, veterinarians, agribusiness, and organic industry representatives, and two extension newsletters. Initial interest came from cooperative extension personnel with livestock or field crop responsibilities in NY, CT, MD, and PA, NRCS, and growers. The program was originally accessed by individuals in at least 6 NY locations, 1 PA, and 1 FL n the day of the broadcast . The program was archived and is available for viewing on our NYS IPM Program webpage at: <http://nysipm.cornell.edu/>. As of September 24, 2007, the program had received 40 “hits” and has been approved by NYS Department of Environmental Conservation as a pesticide recertification credit on-line program.

### **Impacts and Contributions/Outcomes**

#### **Dairy Fly IPM Workshop:**

A listserve has been created to enhance communication among northeast region clientele interested in dairy livestock IPM including NE IPM and SARE programs, state partners, producers and other industry identified personnel. The workshop increased visibility of the Cornell Veterinary Entomology and NYS IPM Programs as sources of regional information regarding management of livestock pests. This increased visibility has resulted in an increase in requests for livestock IPM information and presentations in and out of NY.

As the result of this workshop at least one participant provided dairy fly IPM training to his New

York Department of Agriculture and Markets Milk Inspector colleagues in a series of workshops during October 2004. Another provided dairy fly IPM training to the northeast Certified Crop Advisors at their annual meeting in Waterloo NY in December 2004.

Following the workshop participants discussed needs and topic opportunities for future northeast region livestock IPM workshops. Suggestions included: General fact sheet on pest trapping and related terminology, with special attention to definitions and clarification about attractants vs. pesticide baits, etc. The document would be geared toward informing about the many options that exist, and the advantages and disadvantages of each (rather than giving specific recommendations about which is best to use)

Organic / IPM – tailoring resources for this unique audience

Pasture Fly Management fact sheet – including pest biology. Participants suggested that providing information about pest life cycles and any portions of a proven effective IPM program may be very useful to generate further innovation and discussion

Economics of Dairy IPM (including manure management issues, i.e. composting; also including potential role of federal cost share monies.

Discussion of best time/format to reach dairy producers for IPM education/training (suggestions included 2 hours on farm in small groups, TAG formula, include lunch, twilight meeting).

Informal method for sharing Livestock IPM information – participants think an email list serve would be useful

Fly Management IPM Poster

Development of Field ID cards, laminated and included in a flip-pack (ID cards with multiple pictures of common pests of: poultry; pests found in food/processing rooms; pasture/range; house/confinement areas and buildings

### **Dairy Fly IPM Webcast:**

This was our first use of webcast technology to extend livestock IPM information to clientele. Feedback from the 24 participants representing five states was encouraging and very positive. Participants felt the web streamed broadcast was useful, pertinent and relevant to their needs and interests, and provided many good ideas and resources. In addition, participants felt the webcast was a great outreach medium, very professionally done, and highly cost effective in terms of minimizing travel expenses. Several commented on the program content and the value of the question and answer session. Several participants shared they were very excited about incorporating knowledge gained into their programming on farms and assisting producers and industry with their dairy fly management.

The webcast was a useful outreach medium, however, it was not totally without issue. Some sites experienced intermittent audio loss. All sites mentioned clarity of slide presentation images needed improvement. The slightly blurred slide presentation appeared to be a technical problem

on the transmission end of the program on the day of the broadcast. To minimize this distraction in future efforts, an advanced copy (pdfs) of presentations will be sent to known host locations as handouts for attendees. Some participants recommended holding webcast workshop earlier in the spring (1-2 weeks) might encourage more participation.

The archived webcast is available in it's entirety, including the power point presentation, through a link on the NYS IPM Program webpage at: <http://nysipm.cornell.edu/>. The NYS Department of Environmental Conservation granted the webcast educational course status enabling individuals with animal industry pesticide licenses (category 1B) to earn pesticide recertification credits. Future efforts to further utilize the web broadcast as an education tool may be explored.

Like participants in the 2 day workshop, webcast viewers had a number of suggestions to enhance the discussion of pest management for dairy animals in confinement including: Greater discussion on effective use and deployment of natural enemies (parasitoids et al) to better manage fly populations, management of rodents and birds, further discussion of external parasites (lice and mange mires) and internal parasites, more information on suppliers of products, and discussion of farm vs. neighbor relationships regarding nuisance fly pests. In addition to these topics several suggestions for future program topics were offered including: A program to feature IPM for fly pests affecting animals on pasture/grazers; pest management for organic dairy producers, dung beetle information, IPM for horses, swine and sheep pests and external parasites

In addition, it is anticipated that participants of either workshop will continue to help initiate and foster improved livestock IPM practitioner communication and networking in the northeast US.

These 2 training opportunities did much to increase regional interest in livestock IPM and improve the visibility of Cornell University Veterinary Entomology and the NYS IPM Program livestock IPM efforts. The increase in requests for information and invitations to state and regional meetings to present Livestock IPM information is, at least in part, a direct consequence of hosting these meetings.

*Further information on Dairy Cattle Integrated Pest Management can be found at:*

*NYS Livestock/Field Crops IPM: <http://www.nysipm.cornell.edu/lfc.html>*

*Cornell University, Veterinary Entomology Program, Department of Entomology*

*<http://www.entomology.cornell.edu/Extension/Vet/index.html>*

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